

A Pilot Study on Concurrent Learning/Teaching Model (CLTM) for Online and In-Class Informatics Students

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Abstract

The Informatics program at Mercer University is offered at four regional academic centers located throughout the state of Georgia. We serve non-traditional students who have primary responsibilities such as caring for family, working, and participating in their communities. We aim to offer availability and access to all required courses, access to full-time faculty instruction, and a realistic schedule to graduation. We face two challenges. One is how to operate multiple courses with limited faculty members while maintaining the minimum operation cost. We are offering online education as one possible solution and this has its own challenges. Subsequently, our second challenge is how to deliver the same quality in-class learning environment in an online format for a course in the technology domain. This past year, Informatics faculty conducted a pilot study on concurrent learning environments for online and in-class Informatics students. Surprisingly, 73% of students favor the concurrent online learning environment.

In this paper, we describe the planning, designing, implementation and assessment of the first pilot of our concurrent learning/teaching model.

Program Background

Mercer University mission to serve the education needs of communities throughout Georgia is partly fulfilled by three campuses located in Macon, Savannah, and Atlanta, Georgia, and three Regional Academic Centers in Douglas, Henry, and Newnan counties (Figure 1). In 2010, to match job market needs, we revised our undergraduate in Information Sys-

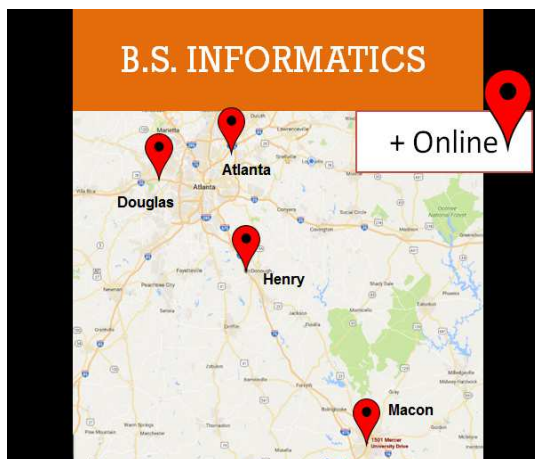


Figure 1. Locations where Mercer University offers face-to-face and online Informatics courses.

tems program in order to offer a totally new undergraduate program in Informatics. The program has three tracks; Health Information Technology, Web Development and Human-Computer Interaction, and General Informatics. We initially offered the program in three locations and added another location in 2013 due to the high inquiries. We currently have less than 100 students in the program and most of them are non-traditional working adults who commute to college. That means we have an average of less than 25 students in each of the four locations and our class size has been an average of 7 – 15 students. To make sure the students can graduate on time, we strive to offer the classes regularly in each of the four locations for students in all three tracks. However, we face two challenges. One is how to operate multiple courses with limited faculty members, while the second challenge is how to maintain the minimum operation cost with offering so many course sessions. Online education is being offered as one possible solution. This delivery format has been growing, especially for graduate programs and according to Clinefelter & Aslanian (2016), IT is becoming a popular graduate field of online study. From 2014 to 2016, the percentage of Computer and IT graduate online students increased from 9% to 20%.

We wonder what kind of online format will best match our students' best interest for our undergraduate Informatics study. In a study with a sample size of 176 undergraduate program students, the authors, Adams & Corbett (2010), concluded that, "The majority of non-traditional students spend upwards of 6 hours each week preparing for class, where only half as many traditional students spend this much time. When looking at learning environment preferences, results show that both traditional and non-traditional students prefer face-to-face classroom learning over online learning." With this data in mind, we would like to find an online delivery format which will mimic our face-to-face class and can meet the needs of students. We started by studying our students' population to learn about their life characteristics and their learning needs.

Concurrent Learning/Teaching Model Design

Informatics is an IT degree, but it is beyond purely an IT degree. We train our students with fundamental logic and programming, database and big data analytics, and provide opportunities to carry out human-computer interaction evaluations. The curriculum is a combination of courses in theory and practice.

Compared to traditional undergraduate degree programs, our student body is much more diverse. Some of our students graduated from two year technical schools and continued into our program to complete their undergraduate study. Some of them are true freshmen students, who never took any college courses before joining us. Instead of going to college, they may have gone directly to a job or joined the military after high school. Another group consists of those looking for career changing opportunities. The IT related and data analytics related program is one of their top picks due to the tremendous market need and the potential employment opportunities available. Plus, they are all interested in the concepts of Informatics, so they choose informatics as their major. Other important student constituencies are those who have been working in an IT related position or industry for quite a while and need formal training and an IT related college degree for promotion. These individuals may already have another undergraduate degree and may be seeking additional knowledge in IT/Informatics or they may be looking for a career change within or outside of their current organization.

Our students are not all at the same level as far as taking an online course or having background knowledge in Informatics. Generally speaking, there are two groups within our student population. One group consists of very advanced, dedicated to learning and relatively independent learners. Their learning habits and work experience in the IT field position them at an advanced level. The other group contains students who are less experienced, needing much more “hand holding” instruction and step by step demonstrations. They appear easily frustrated when facing a problem. For the first group, we need to make sure the content we are delivering is current and related to life and jobs so that those students can use this knowledge right away. For the second group, besides the content, we also need to shape their study habits and time management, help them build confidence throughout their study, and train their logical thinking skills. This has to be done in the way we deliver our courses. No matter at what level they are, we are hoping that by the time they graduate, they can claim to have the same strong knowledge of Informatics, solid skills in programming, data and analysis, and system evaluation, no matter if they are taking a new job or continuing with their current position.

So, what should we do in one classroom to match everyone’s needs? What kind of training should we design and develop for our fellow students to support their success in the future? And, what kind of format will be the best choice to deliver this training to all of the different groups of students, while balancing all the students’ common interests with our limited faculty resources? These are tough questions to answer.

Many studies show that in order to be successful in an online course, a student must be able to manage their time effectively and efficiently, fully engage in the online learning activities, be self-motivated, and be willing to learn independently. One of the important reasons adult learners are more attracted to online study is that they have a clear goal for their study and they are more self-motivated. However, not every one of our students belongs to that “learning independently” category or has efficient time management skills. Also, some are more visual and auditory learners. Students often make comments in course evaluations such as, “I would like to use my own hands to touch, feel and practice to learn”. This type of comment is consistent with what the article “Principles of Adult Learning Instructional Systems Design” summarized regarding three primary learning styles and how they match well with adult learners: visual, auditory, and kinesthetic. It means our students like to learn by looking and watching demonstrations, by listening and hearing, as well as by touching, experiencing, and doing. We paid close attention to this fact when we developed the method for delivering the Informatics content to our adult learners. In addition, we believe some of our technical courses, such as programming languages and web development courses cannot be delivered in the asynchronous online format. In these types of courses students have learning style needs for real-time student-instructor interactions. We developed the following Concurrent Learning/Teaching Model (CLTM) with the hope of balancing all of the needs within one class (Figure 2).

Concurrent Learning/Teaching Model Development

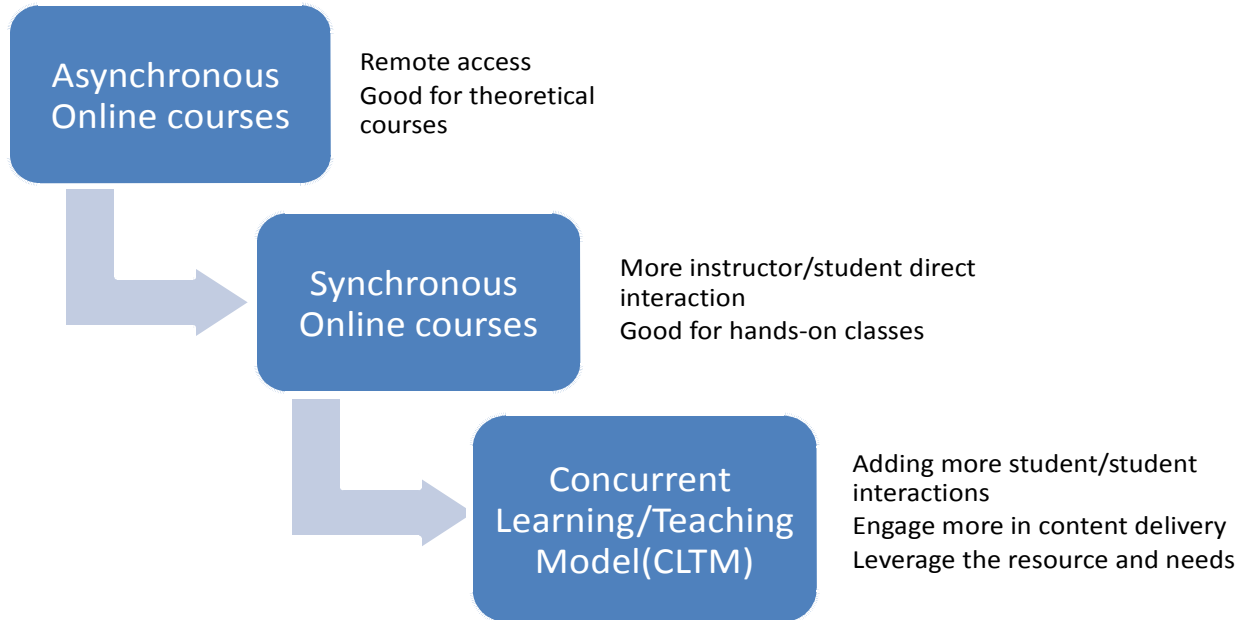


Figure 2. Mercer Informatics CLTM Development Roadmap

In the first step, we divided the courses we offered into two categories including: asynchronous online courses, and synchronous online courses. The first set of courses includes INFM321 Technology and Culture, and INFM301 Issue in Technology Management. These are relatively theory based classes, and they were successfully offered within the asynchronous online format without many complaints.

Adult students have many roles in their life. According to , adult learners spend only half of the time they need to practice for their assignments at home. Considering the notion that hands-on practice and lab work are very important to a course like programming language, we made this type of course available in a synchronous online format instead of an asynchronous format. Without synchronous meetings, students seemed to get easily lost or could not follow the instructions easily. “Some students just disappeared and never got on the course Blackboard shell, consequently receiving an ‘F’ grade due to no-show.” This trend is also seen in courses in other programs in our college and unpublished data indicate a greater number of D and F grades and higher withdrawal rates in online than in face-to-face courses.

In the Informatics program, we schedule our classes based on a two-year schedule to make sure that all of our students are registered and on track for degree completion within a period of two years. We have 22 courses that make up the major. With the new online sections included in addition to the face-to-face sections, we have a total of 55 course sections a year to teach. Our student numbers in the major have not changed since offering the online course sections. We now have only 3-10 students in a course sections and course sections have been cancelled due to low enrollments.

As a solution, in 2014 we piloted our first concurrent teaching course, INFM322 Multimedia and Web Design Tools. By “concurrent teaching”, we mean that during a class session, an instructor teaches students face-to-face in a physical classroom while also teaching students who join online, live, through the instructor sharing their computer screen remotely. The format was very welcomed right away by both the online and in-class students. Some of the audio-technical issues in the computer lab caused

frustration as reported by students in their end-of-course evaluations. As the audio problems became fixed, the communication became much better among the students in the class and the online students. That student-student interaction added some further interest for students engaging in the class content. The software package we used at the time was known as TeamViewer¹ and Blackboard Collaborate². All the sessions are recorded for students to review after class meetings.

In 2015, we started to use the new platform of WebEx³ for the concurrent learning/teaching model courses. There was a very small learning curve, as the WebEx is very similar to TeamViewer. Some students and faculty members did experience a little problem with using the computer for audio function but after a few times of using it, everyone was able to handle this problem. So far, we have about ten courses that have been taught with this concurrent session model with success. Figure 3 shows steps and tips for preparing for CLTM classes.

The first step of setting up the CLTM class sections is the scheduling process. Both the in-class and the online courses must be scheduled at the same date/time. The instructions for the first online meeting announcement are extremely important to eliminate any confusion for students. The instructions need to be accessed by students before the semester begins and a pre-class testing session of the sharing software is included, which is greatly appreciated by students who have never used the format before. During the class meetings, the instructor should always come early to the classroom to set up all of the synchronous equipment, distribute the headsets to each of the students in the class, and get the online meeting started before the scheduled class start time. We recommend that a consistent screen sharing and/or videoconference link be provided to the students and that meeting and link reminders be sent to the students on a regular basis. We encourage students in the class room to join the virtual meeting session as well so they can communicate with online students. When the lecture starts, the instructor should share his/her screen with everyone so that both online students and in-class students can see the instructor's screen and watch the steps that the instructor does. No matter whether it is the lecture, programming demonstrations, site development or graphic design, this sharing is in real time. Assigning students from the online section and classroom section together to collaborate for a group project is a great strategy to engage both the online students and the in-class students. Audio interaction has been our primary communication channel. The instructor always wants to encourage students to ask questions and to stay engaged. Whenever a student experiences difficulty on any project, it is very efficient to switch the screen to the student to help with debugging the problem. Our survey shows that students also seemed to really appreciate that.

All of the important demonstration sessions in the class are recorded in real-time and all recorded sessions are published to the course learning management system as soon as the class session finishes. Students also found this feature to be very helpful. Below is a map to assist you with preparing for a CLTM class.

1

¹ <https://www.teamviewer.com>

2

² <http://www.blackboard.com/online-collaborative-learning/blackboard-collaborate.aspx>

3

³ <https://www.webex.com/>

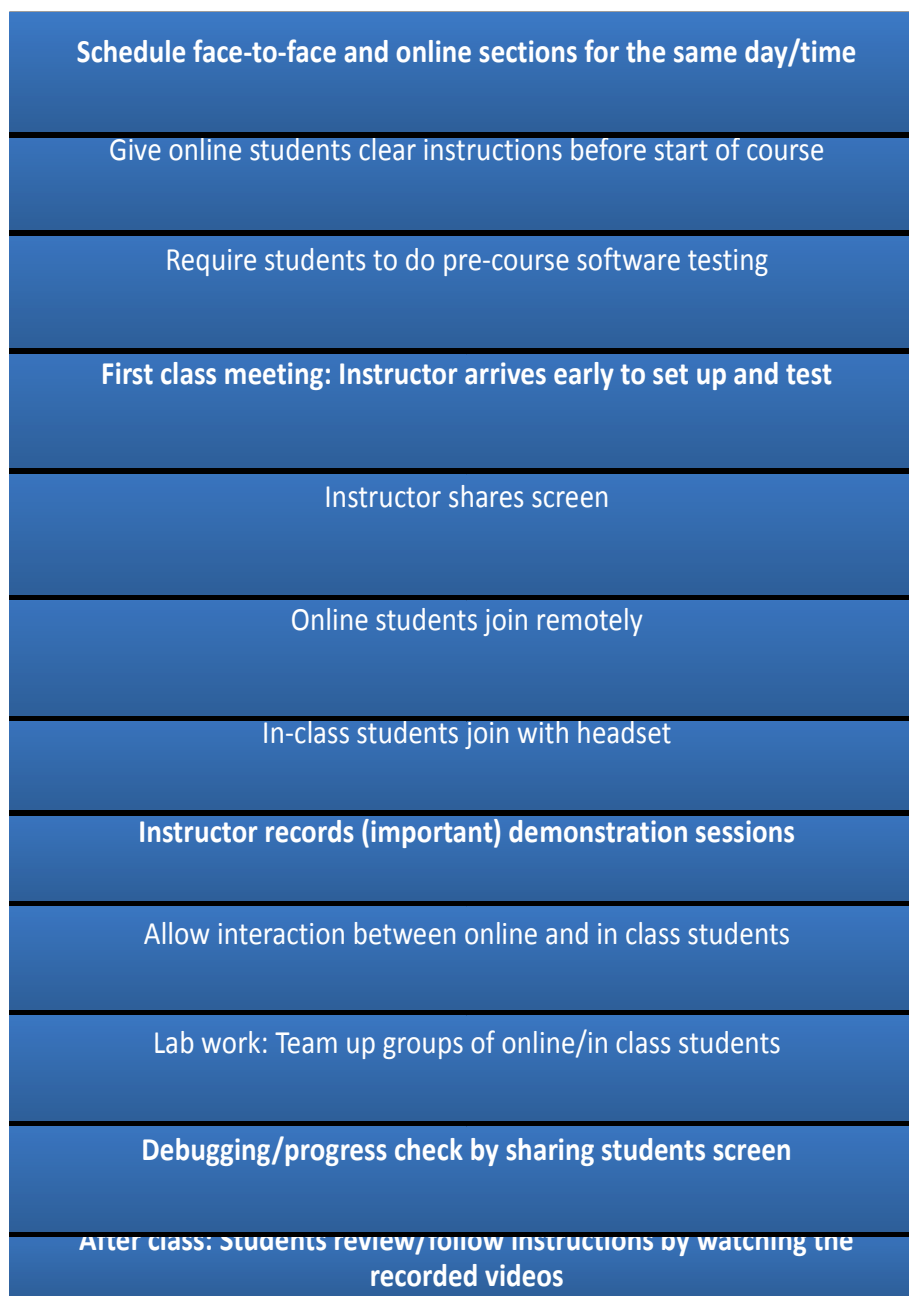


Figure 3. A map for preparing you for a CLTM class

Concurrent Learning/Teaching Model Assessment

To evaluate the CLTM model, we created an online survey for students who participated in the CLTM courses in the fall 2016 semester. We assessed student satisfaction ratings of the concurrent format along with the engagement ratings, including some open comments. For the 15 students who participated, all gave positive feedback about the format and indicated that the group actually looks forward to taking more classes in CLTM format. We were surprised to find that 11 out of the 15 students who took part in the survey favored the CLTM learning environment as compared to 4 out of those 15 who

still prefer the face to face format. Interestingly, none of the group chose to take the asynchronous online classes.

Eighty-seven percent of the participants rated the recorded demonstration video clips captured from the class as very helpful and 87% of them rated the format of the classes as very engaged. The following statements are comments collected from the students about the CLTM format:

- [I liked that the instructor asked] Questions directly to me or [was] showing my work. [I liked] Helping troubleshoot other students' code
- I am able to share my screen remotely whenever I don't understand anything in class and the professor is always there to assist me. Asking and answering questions, and giving comments in class.
- The synchronous method is a happy medium for an adult learner. Without having to drive all the way to the campus after work, I can participate from the comfort of my own home and still be engaged.

A full report of the [survey results](#)⁴ can be accessed online.

Conclusion and Future Work

As the survey results show, using WebEx and TeamViewer for live online class meetings was a successful format for many of our students, even while there is still a good percentage of students who seem to love to be in the “brick and mortar” classroom. The next step in the planned implementation is to run two physical face-to-face sections of the same simultaneously in a hybrid format with the instructor attending in person between two teaching locations every other class meeting. The online students will join simultaneously, live through screen sharing and videoconferencing applications. When a hybrid course section is in its online phase, those students will also join simultaneously online. We are planning to pilot this new format in the fall of 2017.

To support our working hypothesis that CLTM is a solution for our adult students in the Informatics domain, we will collect new types of data as we implement this new format. Besides course evaluations, student surveys, and student and faculty feedback, we will also analyze retention rates and student course grades in order to evaluate the quality and effectiveness of CLTM in enhancing student academic success and self-efficacy in online learning. We hope our continuing assessment of the CLTM format will help us collect more evidence on how to create a positive, engaging, pleasing, affordable and convenient format for delivering our online class to our adult learners in the IT/Informatics domain.

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